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The Functionality Appreciation Scale (FAS)

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The Functionality Appreciation Scale (FAS): Development and psychometric evaluation in U.S. community women and men

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ABSTRACT

Body functionality has been identified as an important dimension of body image that has the potential to be useful in the prevention and treatment of negative body image and in the enhancement of positive body image. Specifically, cultivating appreciation of body functionality may offset appearance concerns. However, a scale assessing this construct has yet to be developed. Therefore, we developed the Functionality Appreciation Scale (FAS) and examined its psychometric properties among three online community samples totalling 1042 women and men (*ns* = 490 and 552, respectively). Exploratory factor analyses revealed a unidimensional structure with seven items. Confirmatory factor analysis upheld its unidimensionality and invariance across gender. The internal consistency, test-retest reliability, criterion-related, and construct (convergent, discriminant, incremental) validity of its scores were upheld. The FAS is a psychometrically sound measure that is unique from existing positive body image measures. Scholars will find the FAS applicable within research and clinical settings.

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1. Introduction

Body image can be defined as an individual's thoughts, feelings, perceptions, and behaviours concerning his or her own body (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Yet, the majority of research on body image has focused on these aspects as related to one's physical appearance, to the exclusion of body functionality. In fact, the paucity of research incorporating body functionality has been identified as one of the key limitations in the field (Cash & Smolak, 2011). *Body functionality* can be defined as everything that the body can do or is capable of doing and encompasses functions related to (a) physical capacities (e.g., flexibility, walking), (b) internal processes (e.g., digesting food, healing from a cold), (c) bodily senses and perceptions (e.g., seeing, feeling physically relaxed), (d) creative endeavours (e.g., drawing, singing), (e) communication with others (e.g., body language, shared laughter), and (f) self-care (e.g., showering, brushing one's teeth; Alleva, Martijn, Van Breukelen, Jansen, & Karos, 2015). Yet, body functionality may be limited by various factors (e.g., diseases, acquired injuries, structural differences); thus, it is more consistent with the definition of positive body image to focus on *appreciating* what the body can do or is capable of doing, rather than simply whether it can do or is capable of doing something (Alleva, Martijn et al., 2015; Bailey, Gammage, van Ingen, & Ditor, 2015; Webb, Wood-Barcalow, & Tylka, 2015). As an example, Bailey et al. (2015) interviewed adults with spinal cord injuries. Many participants appreciated what their bodies could do (e.g., being grateful for the function of the upper body) and celebrated functional gains (e.g., regaining some mobility). The appreciation of body functionality has been noted in many additional qualitative studies of individuals who espouse a positive body image (Frisén & Holmqvist, 2010; McHugh, Coppola, & Sabiston, 2014; Wood-Barcalow, Tylka, & Augustus-Horvath, 2010), leading Halliwell (2015) to conceptualise it as a central component of positive body image in need of more research.

Researching body functionality, especially the appreciation of body functionality, in addition to physical appearance is important for obtaining a more *complete* and *comprehensive* understanding of body image. After all, the human body is not only its outer appearance, but also its capabilities; as such, body image research must incorporate both of these "halves" (Cash & Smolak, 2011; Tylka & Wood-Barcalow, 2015b). Much can be gained from investigating body image in this manner, such as discovering how experiences of body functionality and physical appearance affect one another

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and develop across time, how perceptions of body functionality are shaped by individual identities (e.g., ethnicity, culture, profession), and in what ways perceptions of body functionality impact self-care behaviours. In addition, researching the appreciation of body functionality is important because it could inspire novel and fruitful approaches for improving body image. More specifically, emphasising the appreciation of the functionality of one's body might be a useful strategy for enhancing positive body image and reducing aspects of negative body image.

Indeed, experimental research has shown that training women with a negative body image to focus on functions that their body performs and discuss why these functions are personally meaningful to them leads to improvements in body image such as increased body appreciation and reduced appearance dissatisfaction, relative to a control group that focused on creativity training (Alleva, Martijn et al., 2015). This approach has also been successful in improving satisfaction with body functionality in undergraduate men and 30–50-year old women (Alleva, Martijn, Jansen, & Nederkoorn, 2014). Physical activity and yoga-based interventions, as well as some forms of dance (e.g., belly dance and street dance), might also work to improve positive body image by helping individuals shift their attention to the functional aspects of their body (Cook-Cottone, Kane, Keddie, & Haugli, 2013; Mahlo & Tiggemann, 2016; Martin & Lichtenberger, 2002; Tiggemann, Coutts, & Clark, 2014; Swami & Tovée, 2009) and appreciate the ways that their body can meaningfully and actively engage with the world (Piran, 2016). Given that most intervention techniques designed to improve body image focus predominantly on appearance-related aspects of body image (Alleva, Sheeran, Webb, Martijn, & Miles, 2015), the development of techniques focusing on the appreciation of body functionality could complement existing techniques and potentially strengthen overall intervention effects.

One major barrier to researching the appreciation of body functionality is the absence of adequate measures for its assessment. The Body Appreciation Scale's original and revised versions (BAS and BAS-2; Avalos, Tylka, & Wood-Barcalow, 2005; Tylka & Wood-Barcalow, 2015a) do not include items that assess the appreciation of body functionality specifically. Indeed, the BAS and BAS-2 items were designed to be nonspecific and encompassing (e.g., "I appreciate the different and unique characteristics of my body"), allowing the respondent the freedom to decide the extent to which they appreciate their body based on any characteristic(s), which could potentially include appearance, function, well-being, and/or other qualities salient to the individual. Thus, the BAS and BAS-2 cannot purely assess the appreciation of body functionality.

Furthermore, in their review of questionnaires to assess aspects of positive body image, Webb et al. (2015) identified commonly-used measures concerning body functionality: (a) the Body Surveillance subscale of the Objectified Body Consciousness Scale (e.g., "I think more about how my body feels than how my body looks;" McKinley & Hyde, 1996); (b) the Functionality Investment (e.g., "I always try to physically challenge myself during physical activities"), Satisfaction (e.g., "I am very happy with my performance in physical activities"), and Values (e.g., "One of the most important reasons why people should take care of their bodies is so they can be physically active") subscales of the Embodied Image Scale (Abbott & Barber, 2010); and (c) the Functionality Awareness (e.g., "I have paid attention to the changing sensations of my body") and Appreciation (e.g., "I have been grateful for what my body has allowed me to do") subscales of an author-developed scale for pregnant women (Rubin & Steinberg, 2011). The Physical Condition subscale of the Body Esteem Scale (Franzoi & Shields, 1984) has also frequently been used to gauge body functionality by having participants rate their satisfaction with body functions such as physical stamina, muscular strength, and energy level; as well as the Self-Objectification Questionnaire, in which participants rank-order the importance of functionality-based and appearance-based attributes (Noll & Fredrickson, 1998).

Although studies incorporating the above mentioned body functionality measures have helped to advance research concerning this construct, these measures are limited in many different respects. First, they do not capture body functionality in a *holistic* sense, as they focus predominantly on the domains of physical capacities and internal processes. Second, many of these measures are limited to able-bodied individuals or have been developed for specific populations (e.g., pregnant women; Rubin & Steinberg, 2011). Third, when using the Body Surveillance subscale and Self-Objectification Questionnaire, functionality-focused attitudes and behaviours are positioned at the opposite end of the continuum from appearance-focused attitudes and behaviours, even though it is unclear that body functionality and physical appearance are opposite ends of the same construct (Webb et al., 2015). Fourth, many of these measures capture *evaluations* of body functionality or domains of body functionality, such as satisfaction with one's physical condition. Yet, research concerning positive body image has suggested that, when it comes to enhancing positive body image and well-being, gratitude and appreciation for one's body may be more important than the degree of satisfaction with one's body (Bailey et al., 2015; Wood-Barcalow et al., 2010). Lastly, none of these measures assess participants' appreciation of the functions that their body does perform, which is a less able-bodied construct and one that is consistent with the literature on positive body image (Tylka & Wood-Barcalow, 2015b).

Given the importance and potential value of research concerning the appreciation of body functionality, as well as the lack of adequate measures for its assessment, the aim of the present research was to develop such a measure: the *Functionality Appreciation Scale* (FAS). Based on existing literature, we defined *functionality appreciation* as appreciating, respecting, and honouring the body for what it is capable of doing, extending beyond mere awareness of body functionality (e.g., knowing that the body can digest food vs. being grateful that the body can digest food). The FAS could provide a valuable contribution to the field by facilitating and inspiring investigations of body functionality, thus helping to fill an important gap in the extant literature (Cash & Smolak, 2011). In the following three studies, we report the development and preliminary psychometric evaluation of this measure.

2. Study 1

The aims of Study 1 were to develop the FAS, explore its factor structure, and evaluate its psychometric properties in a sample of U.S. community women and men. Specifically, we investigated the internal consistency, construct validity, and incremental validity of the FAS's scores. We hypothesised that the FAS would adhere to a unidimensional solution (H1) and that FAS scores would be internally consistent (H2). We also predicted that the FAS would be positively correlated with other dimensions of positive body image (body appreciation, body image flexibility) and body satisfaction (appearance evaluation, satisfaction with physical condition), and negatively correlated with dimensions of negative body image (appearance orientation, internalisation of the thin and muscular ideal, self-objectification, body surveillance), yielding evidence for convergent validity (H3). Additional evidence of the FAS's construct validity was examined via its connections to well-being. We hypothesised that the FAS would be positively correlated with components of well-being (self-esteem, gratitude) and negatively correlated with components of ill-being (anxiety, depression; H4). Indeed, individuals endorsing a positive body image have indicated that appreciating their body functionality is tied to their well-being (Frisén & Holmqvist, 2010; Wood-Barcalow et al., 2010).

We predicted that the FAS would be positively associated with adaptive (i.e., intuitive) eating and negatively related to disordered eating (eating restraint, eating concerns), which would yield evidence of the FAS's criterion-related (i.e., concurrent) validity (H5). Indeed, a functional orientation to the body has been theorised to be linked to intuitive eating (Avalos & Tylka, 2006) while a non-functional, appearance orientation towards the body has been linked to disordered eating (Petrie, Greenleaf, Reel, & Carter, 2009).

We hypothesised that functionality appreciation is a unique construct from low levels of appearance-focused attitudes and behaviour, high levels of body appreciation, and high levels of satisfaction with physical condition, garnering evidence for the FAS's incremental validity (H6). Based on the acceptance model of intuitive eating (Avalos & Tylka, 2006), the FAS should be uniquely associated with body appreciation and intuitive eating beyond low levels of appearance-focused attitudes and behaviour (i.e., body surveillance, self-objectification, internalisation of the thin ideal, internalisation of the muscular ideal, and appearance orientation). Further, the FAS should be distinguishable from body appreciation (as they are both body-specific forms of gratitude) and satisfaction with physical condition (as they both focus on body function). Thus, we examined whether the FAS is linked to (a) gratitude beyond high levels of body appreciation and (b) body appreciation beyond high levels of satisfaction with physical condition.

2.1. Method

2.1.1. Participants and procedure

This study was approved by the ethics committee at Maastricht University. Participants were recruited for a study about "body image and well-being" via Amazon Mechanical Turk (MTurk). MTurk is a website whereby individuals can complete surveys or other tasks (referred to as "hits") for money. MTurk is a reliable and valid method for data collection on body image (Gardner, Brown, & Boice, 2012), and samples recruited via MTurk are often more diverse in terms of age, racial/ethnic identification, and sexual orientation compared to samples recruited from a university or college campus (Buhrmester, Kwang, & Gosling, 2011).

Women and men were eligible to participate if they were U.S. citizens, at least 18 years old, fluent in English, had completed at least 100 hits on MTurk, and had their work approved at least 98% of the time. Though participants were recruited via MTurk, they received a link to complete the study online via Qualtrics. First, they signed an electronic informed consent sheet, followed by the measures. The FAS was completed first to promote initial attention to the individual items (our priority given that item choice, factor structure, and internal consistency hinge on participant attentiveness on the FAS), followed by the remaining measures in a counterbalanced order (to control for order effects). The demographic items were completed last. Participants received $2 for their participation, which is consistent with compensation for other MTurk studies of this nature and duration.

Participants were removed from the final dataset if they terminated early or had significant missing data ($n = 18$), or if they failed at least one of four embedded validity questions ($n = 15$). No participant took the survey more than once, as was determined by no duplicate MTurk ID codes. From the initial dataset of 286 participants, 122 women and 131 men remained, and their data were analysed. Women ($M_{age} = 36.39$, $SD = 11.08$) and men ($M_{age} = 33.24$, $SD = 10.46$) were between 18 and 74 years old; 23.3% of the sample was age 40 and above, and 11.5% was age 50 and above. Women's self-reported body mass index (BMI) ranged from 17.36 to 52.93 ($M_{BMI} = 26.86$, $SD = 7.26$), and men's self-reported BMI ranged from 16.93 to 59.99 ($M_{BMI} = 26.71$, $SD = 7.02$). Participants identified as White (70.8%), Black (10.7%), Asian (8.3%), Latina/o (6.3%), and Multiracial (3.6%); an additional participant (0.4%) did not respond. Their highest educational level was high school diploma or GED (13.4%), some college (29.2%), Associates degree (12.6%), Bachelor's degree (36.0%), some graduate school (0.8%), and a graduate degree (7.9%). The majority of women (87.7%) and men (88.5%) identified as heterosexual; 4.9% of women identified as lesbian and 5.7% of men identified as gay; and 6.1% and 4.6% of women and men, respectively, identified as bisexual.

2.1.2. Measures

2.1.2.1. Development of the Functionality Appreciation Scale (FAS). FAS items were developed to reflect our conceptualisation of *functionality appreciation*: appreciating, respecting, and honouring the body for what it is capable of doing, and extending beyond mere awareness of body functionality. We were careful to construct FAS items so that they could be applicable to diverse body functions, reflect each individual's unique capabilities, and general enough so as to be relevant across individual identities (e.g., cultures, genders). This way, the items were not restricted to any one domain of functioning, limited to able-bodied individuals, or tied to any one individual identity. Thus, we were not interested in measuring body functioning per se, or the appreciation of specific domains of body functionality, but rather the overall appreciation of the body's ability to function *to the extent that it can*. We aimed to develop an item pool that was more comprehensive and broader than the target construct, erroring on the side of over-inclusiveness (Clark & Watson, 1995).

With these points in mind, and after consulting the literature on body appreciation (e.g., Tylka & Wood-Barcalow, 2015a, 2015b), body functionality (e.g., Alleva, Martijn et al., 2015), and embodiment (Piran, 2015), we collaborated to develop an initial set of 22 items. We then sent these items to six content experts in the fields of positive body image and embodiment. These experts provided feedback on the potential FAS items regarding clarity, whether they reflected our conceptualisation of functionality appreciation, and whether any items should be added or removed. After reviewing their feedback, we added four items and revised several other items for clarity. One content expert suggested that some of our generated items may be assessing the awareness of body functions or behavioural self-care to preserve body functions more so than functionality appreciation. We retained all items to determine whether these identified items were facets of functionality appreciation or distinct constructs, again erroring on the side of over-inclusiveness as recommended by Clark and Watson (1995). Thus, we had 26 potential FAS items,[1] each rated from 1 to 5, where 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. We planned to average participants' scores on the retained items, with higher scores reflecting greater functionality appreciation.

2.1.2.2. Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015a). The BAS-2 includes 10 items (e.g., "I respect my body") that are rated on a 5-point scale ranging from 1 = *never* to 5 = *always*. Participants' scores on these items are averaged, with higher scores reflecting greater body appreciation. BAS-2 scores have demonstrated internal consistency, construct validity, and 21-day test-retest reliability in U.S. community and undergraduate women and men (Tylka & Wood-Barcalow, 2015a). Cronbach's alpha in the present study was .96 (.97 women, .94 men).

2.1.2.3. Body Image Acceptance and Action Questionnaire (BI-AAQ; Sandoz, Wilson, Merwin, & Kellum, 2013). The BI-AAQ comprises 12 items (e.g., "I shut down when I feel bad about my body shape

[1] Please contact the first author to access the complete set of the original 26 items.

or weight") rated on a 7-point scale ranging from 1 = *never true* to 7 = *always true*. Participants' scores on the items are reverse-scored and averaged; lower scores reflect higher levels of body image flexibility. BI-AAQ scores have demonstrated internal consistency, construct validity, and 2–3-week test-retest reliability in U.S. female and male university students (Sandoz et al., 2013). Cronbach's alpha in the present study was .95 (.95 women, .95 men).

2.1.2.4. Appearance Evaluation and Appearance Orientation subscales of the Multidimensional Body-Self Relations Questionnaire (MBSRQ; Brown, Cash, & Mikulka, 1990; Cash, 2000). The Appearance Evaluation (seven items; e.g., "My body is sexually appealing") and Appearance Orientation (12 items; e.g., "Before going out in public, I always notice how I look") subscales are rated on a 5-point scale ranging from 1 = *definitely disagree* to 5 = *definitely agree*. Participants' scores on the items of each subscale are averaged, with higher scores reflecting greater appearance satisfaction and appearance orientation, respectively. Scores on both subscales have demonstrated internal consistency, construct validity, and 1-month test-retest reliability in U.S. women and men over 18 years old (Cash, 2000). In the present study, Cronbach's alphas were .94 (.95 women, .93 men) for Appearance Evaluation and .90 (.89 women, .89 men) for Appearance Orientation.

2.1.2.5. Physical Condition subscale of the Body Esteem Scale (BES; Franzoi & Shields, 1984). The 9-item Physical Condition subscale of the BES assesses participants' feelings towards nine bodily attributes (e.g., health, energy level) and are rated on a 7-point scale ranging from 1 = *strongly dislike* to 7 = *strongly like*. Participants' scores on the items are averaged; higher scores reflect greater satisfaction with one's physical condition. Scores on the Physical Condition subscale have demonstrated internal consistency, construct validity, and 3-month test-retest reliability in U.S. female and male undergraduates (Franzoi, 1994; Franzoi & Herzog, 1986; Franzoi & Shields, 1984). Cronbach's alpha in the present study was .93 (.94 women, .91 men).

2.1.2.6. Body Surveillance subscale Objectified Body Consciousness Scale (OBC; McKinley & Hyde, 1996). The Body Surveillance subscale was used to measure participants' tendency to habitually monitor their external appearance rather than focus on how their body functions. This subscale comprises eight items (e.g., "During the day, I think about how I look many times") rated on a 7-point scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Participants' scores on these items are averaged and higher scores reflect higher levels of body surveillance. Body Surveillance subscale scores have demonstrated internal consistency and construct validity in U.S. community and undergraduate women (McKinley & Hyde, 1996) and U.S. undergraduate women and men (Tylka & Wood-Barcalow, 2015a). Cronbach's alpha in the present study was .86 (.86 women, .86 men).

2.1.2.7. Self-Objectification Questionnaire (SOQ; Noll & Fredrickson, 1998). On the SOQ, participants rank-order 10 bodily attributes from the attribute that has the least impact on their physical self-concept to the attribute that has the most impact on their physical self-concept. Of the 10 bodily attributes, five are appearance-related (e.g., weight) and five are functionality-related (e.g., health). To obtain the SOQ total score, the attribute ranked as least impactful is given a score of 1, the attribute ranked as second-least impactful is given a score of 2, and so on. Then, the sum of the scores for the functionality-related items is subtracted from the sum of the scores for the appearance-related items. Final SOQ scores range from −25 to 25, with higher scores reflecting higher levels of self-objectification. SOQ scores have demonstrated construct validity in U.S. and U.K. college and community women and men (Calogero, 2009; Noll & Fredrickson, 1998). Due to the rank-ordering of its items, Cronbach's alpha is not calculated for the SOQ.

2.1.2.8. Thin/Low Body Fat and Muscular/Athletic subscales of the Sociocultural Attitudes Towards Appearance Questionnaire — revised (SATAQ-4; Schaefer et al., 2015). The Thin/Low Body Fat (e.g., "I want my body to look very lean") and Muscular/Athletic (e.g., "I think a lot about looking athletic") subscales each contain five items that are rated on a 5-point scale ranging from 1 = *definitely disagree* to 5 = *definitely agree*. Subscale items are averaged, with higher scores reflecting greater internalisation of the thin/low body fat ideal and the muscular/athletic ideal, respectively. Subscale scores have demonstrated internal consistency and construct validity in U.S. community and undergraduate women and in U.S. undergraduate men (Schaefer et al., 2015). In the present study, Cronbach's alphas were .86 (.88 for women, .80 for men) for the Thin/Low Body Fat subscale and .92 (.92 women, .90 men) for the Muscular/Athletic subscale.

2.1.2.9. Intuitive Eating Scale-2 (IES-2; Tylka & Kroon Van Diest, 2013). The IES-2 contains 23 items, which are rated on a 5-point scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. It is divided into four subscales: Unconditional Permission to Eat (UPE; e.g., "I allow myself to eat what food I desire at the moment"), Eating for Physical Rather than Emotional Reasons (EPR; e.g., "I find other ways to cope with stress and anxiety than by eating"), Reliance on Hunger and Satiety Cues (RHSC; e.g., "I trust my body to tell me when to eat"), and Body-Food Choice Congruence (B-FCC; e.g., "I mostly eat foods that give my body energy and stamina"). Subscale items are averaged, and higher scores reflect higher levels of the respective aspect of intuitive eating. An overall IES-2 score can also be obtained by averaging the scores on all 23 items. IES-2 scores have demonstrated internal consistency, construct validity, and 3-week test-retest reliability in U.S. university women and men (Tylka & Kroon Van Diest, 2013) and U.S. community women and men (Tylka, Calogero, & Daníelsdóttir, 2015). In the present study, Cronbach's alphas were .88 (.88 women, .88 men) for the IES-2 total score; .83 (.83 women, .83 men) for UPE; .92 (.92 women, .92 men) for EPR; .90 (.91 women, .88 men) for RHSC; and .89 (.91 women, .86 men) for B-FCC.

2.1.2.10. Restraint and Eating Concern subscales of the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994). The Restraint (e.g., "Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?") and Eating Concern (e.g., "Have you had a definite fear of losing control over eating?") subscales each contain five items concerning the frequency of particular experiences over the past 28 days. Item are rated on a 7-point scale ranging from 0 (lower frequency) to 6 (greater frequency), with endpoints varying depending on the question. Scores on the items of each subscale are averaged, with higher scores reflecting higher levels of restraint and eating concern, respectively. Subscale scores have demonstrated internal consistency and construct validity in U.S. community women (Mond, Hay, Rodgers, Owen, & Beumont, 2004) and college men (Lavender, De Young, & Anderson, 2010). In the present study, Cronbach's alphas were .87 (.86 women, .87 men) for Restraint and .83 (.82 women, .85 men) for Eating Concern.

2.1.2.11. Gratitude Questionnaire (GQ-6; McCullough, Emmons, & Tsang, 2002). The GQ-6 contains six items (e.g., "I have so much in life to be thankful for") rated on a 7-point scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Item scores are averaged, with higher scores reflecting higher levels of general gratitude. GQ-6 scores have demonstrated internal consistency and construct validity in U.S. community and undergraduate women and men

(McCullough et al., 2002). Cronbach's alpha was .81 (.77 women, .83 men) in the present study.

2.1.2.12. Single Item Self-Esteem Scale (SISE; Robins, Hendin, & Trzesniewski, 2001). The SISE asks participants to indicate how much they agree with the statement, "I have high self-esteem," from 1 = *strongly disagree* to 5 = *strongly agree*. Higher SISE scores reflect higher levels of self-esteem. The SISE is a practical alternative to the 10-item Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965). In U.S. community and undergraduate women and men, the SISE has demonstrated convergent validity via its strong correlation with the RSE, and the SISE and RSE have shown nearly identical correlations with a variety of criterion measures (e.g., self-evaluative biases; Robins et al., 2001).

2.1.2.13. Anxiety and Depression subscales of the Patient-Reported Outcomes Measurement Information System (PROMIS; Cella et al., 2010; Health Measures, 2017). The Anxiety (e.g., "I felt fearful") and Depression (e.g., "I felt worthless") subscales of the PROMIS each contain four items that reflect how participants have felt in the past seven days. The items are rated on a 5-point scale ranging from 1 = *never* to 5 = *always*. Scores on the items of each subscale are averaged, with higher scores reflecting higher levels of anxiety and depression, respectively. Research in U.S. community women and men has shown that the Anxiety and Depression subscale scores have demonstrated internal consistency and construct validity (Health Measures, 2017). In the present study, Cronbach's alphas were .92 (.94 women, .90 men) for Anxiety and .93 (.94 women, .93 men) for Depression.

2.1.2.14. Demographic items. Participants provided information concerning their age, weight and height (to calculate BMI), ethnicity, highest completed educational level, and sexual orientation.

2.2. Results and discussion

2.2.1. Preliminary analyses

We examined item trends in missing data, which revealed that 20.16% of participants had at least one missing data point. The missing individual data points constituted a very small amount of the total data (0.23%) and were missing completely at random according to Little's MCAR analysis, $\chi^2(6830) = 6555.94$, $p = .991$. Thus, we used multiple imputation (i.e., fully conditional specification) to estimate missing values.

FAS items and scale/subscale scores were examined for normality of distribution, because skewness values >3 and/or kurtosis values >10 may pose problems in regression analyses (Kline, 2010). Skewness and kurtosis values for the FAS items and other scale and subscale scores were lower than these limits, preventing any need for transformation.

2.2.2. Exploring the FAS's factor structure

A principal axis exploratory factor analysis (PAF) was conducted on the 26 potential FAS items using SPSS 23.0. The number of participants exceeded the recommended 5:1 cases-to-parameter ratio needed to confidently examine a model (Bentler, 1990). We used Direct Oblimin rotation and specified delta to be 0; this specification would allow factors to be correlated, should two or more factors emerge.

Parallel analysis was used to inform the number of factors to extract, given that it estimates the number of factors in a data set more accurately than the eigenvalue >1 criterion or scree plot breaks or discontinuities (Brown, 2006; Fabrigar, Wegener, MacCallum, & Strahan, 1999). The rationale behind parallel analysis is that the factor(s) underlying a measure should account for more variance than is expected by chance. To assess scale structure, then, factor analysis is performed on the actual data as well as multiple sets of random data (in this case, 10,000) that have the same dimensions as the actual data set. When the eigenvalue linked to the analysis of the actual data exceeds the corresponding pooled eigenvalue from the analysis of the random data, the factor associated with this eigenvalue is retained. However, the items of the retained factor(s) need to have (a) an item-factor loading of at least .50 on a primary factor, (b) cross-loadings less than .30 on additional factors, and (c) values <|.30| in the off-diagonal area of the anti-image correlation matrix[2] (Brown, 2006; Tabachnick & Fidell, 2007). Moreover, given that "there is no substitute for good theory and careful thought when using these [factor analytic] techniques" (Clark & Watson, 1995, p. 314), we planned to integrate analytic results and theory in making decisions regarding item retention versus item elimination.

The size of the Kaiser-Meyer-Oklin measure of sampling adequacy (KMO = .926) revealed that the FAS items had adequate common variance for factor analysis, and the significance of Bartlett's test of sphericity, $\chi^2(32) = 3468.60$, $p < .001$, indicated that the correlation matrix was factorable (Tabachnick & Fidell, 2007). Parallel analysis suggested that three factors had an eigenvalue greater than the corresponding random data eigenvalues. However, the rotated matrices indicated that items that loaded on the second and third factor cross-loaded on the first factor and items that loaded on the first factor cross-loaded with items on the second and/or third factor. For these reasons, the second and third factors were non-interpretable. When only the first factor was specified; 20 items loaded ≥.50 on this factor, and thus six items were deleted. Additionally, four item pairs demonstrated evidence of statistical redundancy (they were correlated more with each other than the other scale items) based on the anti-image correlation matrix; we deleted one item within each pair based on content, clarity, and/or lower item-factor loadings. Consequently, 16 items remained that met the analytic criteria for inclusion specified above.

Given that only one factor was present, we wanted to refine this set of 16 items further to arrive at a shorter version of the scale that would be true to the construct definition and parsimonious for researchers to include within their data collection efforts (Clark & Watson, 1995). We compared the content of each of the 16 items to our original definition and deleted four items that assessed awareness of body functions (e.g., "I feel 'in tune' with my body's functions") and one item that assessed self-care to promote body function ("I take care of my body so it can function the best it is able to"). We deleted four additional items that appeared to overlap in content with other items and thus were deemed redundant.[3] Redundancy of content among several items will create an overly narrow scale that will not assess the construct optimally, referred to as the "attenuation paradox" (Clark

[2] The anti-image correlation matrix reveals items that correlate with other items above and beyond the factor, suggesting item redundancy. Each off-diagonal value in this matrix represents the correlation between the corresponding items after controlling for the other items and multiplied by −1 (i.e., these values represent the negatives of the partial correlation coefficients). Values that exceed around |.30| represent items that are correlated with each other above and beyond the factor, and researchers are encouraged to eliminate one of the items in each highly correlated pair. Values around |.30| and under suggest low item redundancy.

[3] "I feel grateful for my body, even if it may not always be able to function as well as I would like it to" was deleted as it was perceived to overlap in content with "I am grateful for the health of my body, even if it isn't always as healthy as I would like it to be." "I am grateful for what my body helps me to do" was deleted as it was perceived to overlap in content with "I appreciate my body for what it is capable of doing." "I view my body's functions as 'gifts'" was deleted as it was perceived to overlap with "I respect my body for the functions it performs." Last, "I am amazed by my body's capabilities" was deleted as it was perceived to overlap in content with "I feel that my body does so much for me."

Table 1
Functionality Appreciation Scale (FAS) standardised item-factor loadings: Studies 1–3.

Factor analysis type	Study 1 Exploratory			Study 2 Exploratory			Study 3 Confirmatory		
Final FAS items	Overall	Women	Men	Overall	Women	Men	Overall	Women	Men
1. I appreciate my body for what it is capable of doing.	.69	.77	.61	.78	.74	.81	.81	.77	.86
2. I am grateful for the health of my body, even if it isn't always as healthy as I would like it to be.	.72	.75	.70	.71	.68	.74	.77	.78	.71
3. I appreciate that my body allows me to communicate and interact with others.	.69	.70	.69	.75	.75	.75	.75	.75	.73
4. I acknowledge and appreciate when my body feels good and/or relaxed.	.59	.56	.60	.61	.59	.63	.63	.67	.57
5. I am grateful that my body enables me to engage in activities that I enjoy or find important.	.81	.80	.81	.74	.72	.77	.82	.87	.77
6. I feel that my body does so much for me.	.64	.65	.63	.77	.71	.83	.82	.84	.80
7. I respect my body for the functions that it performs.	.63	.70	.57	.79	.81	.79	.77	.74	.81

Note: Study 1 $N = 253$ (122 women, 131 men), Study 2 $N = 293$ (134 women, 159 men), Study 3 $N = 496$ (234 women, 262 men).

& Watson, 1995; Loevinger, 1954). The final seven items (see Table 1) assessed our core construct of functionality appreciation in a comprehensive, yet also parsimonious and non-redundant manner.

A factor analysis using PAF with Varimax rotation, which maximizes variance on the first factor, was conducted on the seven remaining items. This analysis revealed a unidimensional solution, accounting for 54.11% of the total item variance. When analysed separately by gender, this unidimensional solution accounted for 56.72% and 51.58% of the total item variance for women and men, respectively. Item-factor loadings for the combined sample, as well as for women and men separately, are in Table 1. Consequently, H1 was supported.

2.2.3. Internal consistency reliability

Cronbach's coefficient alpha estimates for FAS scores were .86 for the combined sample as well as .87 and .84 for women and men, respectively. Corrected item-total correlations ranged from .54–.73 for the combined sample (.51–.74 for women, .52–.73 for men). Thus, the FAS yielded evidence of internal consistency for women and men, upholding H2.

2.2.4. FAS means and correlations with BMI and age

The means of the seven FAS items and total FAS were calculated for women and men combined as well as separately by gender; these means are included in Table 2. When compared to men, women demonstrated higher FAS scores; the effect size revealed a small degree of difference according to Cohen (1992).

Due to the large number of correlations examined in Study 1 (i.e., 20), the p-value was reduced to .003 to adjust for multiple comparisons. Correlations were considered strong if $rs \geq .50$, moderate if rs are around .30, and small/negligible if rs are around .10 (Cohen, 1992). In cases where correlations are small in magnitude yet nonsignificant according to the adjusted p-value, we describe them as nonsignificant. The FAS was unrelated to BMI for the total sample ($r = -.08$, $p = .181$), as well as for women ($r = -.05$, $p = .587$) and men ($r = -.12$, $p = .163$) separately. Similarly, the FAS was not associated with age for the total sample ($r = .12$, $p = .062$) or women ($r = .12$, $p = .178$) and men ($r = .08$, $p = .393$) separately.

2.2.5. Construct validity

It was hypothesised that the FAS would be related to established measures of body image. When analysing women and men combined, the FAS, as hypothesised, was strongly positively correlated with body appreciation ($r = .60$, $p < .001$) and moderately-to-strongly positively correlated with satisfaction with physical condition ($r = .47$, $p < .001$) and appearance evaluation ($r = .39$, $p < .001$). The FAS was slightly-to-moderately related to body image flexibility ($r = .22$, $p = .001$) and self-objectification ($r = -.15$, $p = .014$); yet, its relationship with internalisation of the muscular ideal ($r = -.13$, $p = .044$) was above the adjusted p-value (.003) and thus nonsignificant. Although these relationships were in the predicted directions, they were smaller than anticipated. Also unexpectedly, FAS scores were positively related to appearance orientation to a small-to-moderate degree ($r = .27$, $p < .001$) when an inverse relationship was predicted, and unrelated to body surveillance ($r = -.08$, $p = .231$) and internalisation of the thin ideal ($r = .01$, $p = .836$) when significant inverse relationships were anticipated.

The FAS was differentially related to many of the body image variables based on participants' gender, however. Table 3 includes correlations for women and men separately. For women, FAS scores were significantly moderately related to body image flexibility ($r = .34$, $p < .001$), body surveillance ($r = -.25$, $p < .003$), and self-objectification ($r = -.32$, $p < .001$), whereas the FAS was not related to these variables for men ($rs = .11$, .04, and $-.01$, respectively; all $ps > .003$). Furthermore, FAS scores were moderately related to appearance orientation ($r = .31$, $p < .001$) and internalisation of the muscular ideal ($r = .27$, $p = .002$) for men, but not women ($rs = .17$ and .08, respectively; $ps > .003$). However, when the strength of these five correlational pairs were compared between women and men using Fisher's r to z transformations with an adjusted p-value of .010, only the FAS and self-objectification correlation ($z = -2.68$, $p = .007$) was significantly different between women and men (all remaining $ps > .020$). Overall, these findings largely uphold H3.

As hypothesised, FAS scores should be related to psychological well-being. Indeed, FAS scores were strongly positively related to gratitude ($r = .57$, $p < .001$), moderately positively related to self-esteem ($r = .36$, $p < .001$) and moderately inversely related to anxiety ($r = -.39$, $p < .001$) and depressed affect ($r = -.42$, $p < .001$), providing support for H4. See Table 3 for FAS correlations with well-being variables separated by gender. While the significance trends were similar between women and men, women experienced stronger correlations between the FAS and well-being, with the correlations being significantly different for gratitude ($z = 2.51$, $p = .006$) and anxiety ($z = -1.97$, $p = .024$).

2.2.6. Criterion-related validity

We anticipated that FAS scores would be related to intuitive eating in a positive direction and disordered eating in an inverse direction. In the overall sample, the FAS was positively moderately related to overall intuitive eating ($r = .30$, $p < .001$) and certain dimensions of intuitive eating including body-food choice congruence ($r = .45$, $p < .001$), reliance on internal hunger and satiety cues ($r = .37$, $p < .001$), and eating for physical reasons ($r = .19$, $p = .003$), supporting H5 for most dimensions of intuitive eating. FAS scores, however, were not related to unconditional permission to eat ($r = -.10$, $p = .109$), eating restraint ($r = .04$, $p = .573$), or eating concerns ($r = -.13$,

Table 2
Functionality Appreciation Scale (FAS) item and total score means and standard deviations: Studies 1–3.

Final FAS items	Study 1				Study 2				Study 3			
	Overall *M* (*SD*)	Women *M* (*SD*)	Men *M* (*SD*)	*d*	Overall *M* (*SD*)	Women *M* (*SD*)	Men *M* (*SD*)	*d*	Overall *M* (*SD*)	Women *M* (*SD*)	Men *M* (*SD*)	*d*
1. I appreciate my body for what it is capable of doing.	4.02 (0.77)	4.11 (0.77)	3.93 (0.76)	0.24	4.09 (0.70)	4.12 (0.72)	4.07 (0.69)	0.07	4.15 (0.77)	4.20 (0.77)	4.10 (0.77)	0.13
2. I am grateful for the health of my body, even if it isn't always as healthy as I would like it to be.	4.05 (0.92)	4.22 (0.81)	3.89 (0.99)	0.36	4.13 (0.88)	4.12 (0.91)	4.14 (0.86)	−0.02	4.22 (0.82)	4.27 (0.83)	4.19 (0.80)	0.10
3. I appreciate that my body allows me to communicate and interact with others.	3.88 (0.86)	3.90 (0.91)	3.86 (0.80)	0.05	4.09 (0.86)	4.11 (0.82)	4.08 (0.90)	0.03	4.26 (0.76)	4.29 (0.74)	4.23 (0.78)	0.08
4. I acknowledge and appreciate when my body feels good and/or relaxed.	4.02 (0.93)	4.17 (0.86)	3.89 (0.97)	0.31	4.18 (0.81)	4.25 (0.76)	4.12 (0.85)	0.16	4.26 (0.79)	4.35 (0.82)	4.19 (0.75)	0.20
5. I am grateful that my body enables me to engage in activities that I enjoy or find important.	4.06 (0.89)	4.17 (0.80)	3.95 (0.96)	0.25	4.24 (0.74)	4.24 (0.80)	4.25 (0.70)	−0.01	4.31 (0.78)	4.34 (0.78)	4.27 (0.77)	0.09
6. I feel that my body does so much for me.	3.88 (0.90)	3.96 (0.91)	3.80 (0.88)	0.18	4.10 (0.78)	4.13 (0.81)	4.08 (0.76)	0.06	4.16 (0.88)	4.19 (0.90)	4.14 (0.86)	0.06
7. I respect my body for the functions that it performs.	3.92 (0.90)	3.98 (0.88)	3.88 (0.93)	0.11	4.10 (0.77)	4.10 (0.81)	4.10 (0.74)	0.00	4.19 (0.77)	4.23 (0.75)	4.16 (0.78)	0.09
FAS total score	3.98 (0.64)	4.07 (0.65)	3.89 (0.64)	0.28	4.13 (0.62)	4.15 (0.61)	4.12 (0.61)	0.05	4.18 (0.63)	4.27 (0.66)	4.18 (0.62)	0.14

Note: Study 1 $N = 253$ (122 women, 131 men), Study 2 $N = 293$ (134 women, 159 men), Study 3 $N = 496$ (234 women, 262 men). d = Cohen's d indicating the degree of difference between women's and men's FAS item means.

Table 3
Study 1 variable means (*M*), standard deviations (*SD*), and correlations.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. FAS	–	.53*	.11	.32*	.31*	.50*	.04	−.01	.20	.27*	.29*	.15	−.09	.47*	.32*	−.29*	−.32*
2. Body appreciation	.67*	–	.35*	.74*	.15	.71*	−.28*	−.15	−.10	.17*	.50*	−.03	−.26*	.51*	.73*	−.39*	−.49*
3. Body image flexibility	.34*	.63*	–	.43*	−.17	.21	−.43*	−.26*	−.41*	−.39*	.62*	−.50*	−.69*	.16	.30*	−.45*	−.42*
4. Appearance evaluation	.48*	.80*	.63*	–	.17	.68*	−.27*	−.13	−.20	.11	.41*	−.12	−.34*	.56*	.68*	−.48*	−.57*
5. Appearance orientation	.17	.18	−.10	.21	–	.22	.59*	.35*	.34*	.47*	.02	.28*	.13	.27*	.14	−.07	−.10
6. BES Satisfaction with physical condition	.46*	.70*	.48*	.69*	.08	–	−.18	−.03	.04	.30*	.35*	.08	−.14	.52*	.62*	−.45*	−.55*
7. Body surveillance	−.23*	−.41*	−.48*	−.32*	.57*	−.24*	–	.56*	.50*	.48*	−.36*	.36*	.31*	−.11	−.22	.21	.22
8. Self-objectification	−.32*	−.50*	−.45*	−.40*	.30*	−.40*	.63*	–	.32*	.25*	−.22	.24*	.25*	−.03	−.16	.11	.12
9. Thin-ideal internalisation	−.16	−.41*	−.55*	−.40*	.26*	−.28*	.47*	.45*	–	.47*	−.20	.45*	.32*	−.06	−.14	.11	.13
10. Muscular-ideal internalisation	.08	.08	−.17	.14	.03	.17	−.05	−.06	.20	–	−.17	.46*	.29*	.15	.18	−.05	−.06
11. Intuitive eating (total score)	.34*	.60*	.63*	.47*	−.02	.42*	−.34*	−.30*	−.34*	−.05	–	−.40*	−.60*	.32*	.33*	−.40*	−.37*
12. Eating restraint	−.07	−.24*	−.48*	−.22	.26*	−.16	.34*	.22	.45*	.23	−.35*	–	.59*	−.05	−.12	.24*	.23
13. Eating concerns	−.18	−.51*	−.65*	−.40*	.16	−.38*	.33*	.23	.42*	.16	−.60*	.62*	–	−.14	−.28*	.53*	.49*
14. Gratitude	.68*	.54*	.34*	.38*	.07	.42*	−.16	−.24	−.17	.01	.29*	−.05	−.24*	–	.53*	−.48*	−.60*
15. Self-esteem	.42*	.75*	.57*	.79*	.22	.67*	−.27*	−.39*	−.37*	.07	.53*	−.11	−.34*	.46*	–	−.50*	−.62*
16. Anxiety	−.50*	−.60*	−.52*	−.45*	−.02	−.50*	.34*	.33*	.38*	.05	−.48*	.13	.41*	−.55*	−.52*	–	.83*
17. Depression	−.51*	−.64*	−.59*	−.58*	−.05	−.60*	.32*	.35*	.42*	.07	−.44*	.20	.39*	−.57*	−.66*	.80*	–
Possible range	1–5	1–5	1–7	1–5	1–5	1–5	−1 to 7	−25 to 25	1–5	1–5	1–5	0–6	0–6	1–7	1–5	1–5	1–5
M women	4.07	3.46	4.98	3.07	3.39	3.25	3.81	−6.75	2.96	2.45	3.37	1.28	0.79	5.34	3.10	1.98	1.81
SD women	0.65	1.05	1.50	1.16	0.76	1.06	1.19	14.14	1.05	1.07	0.64	1.54	1.11	1.04	1.40	1.00	1.04
M men	3.89	3.41	5.13	3.12	3.07	3.32	4.03	−7.92	2.92	3.13	3.47	1.44	0.76	4.90	3.27	1.97	1.95
SD men	0.64	0.85	1.41	1.00	0.78	0.89	1.13	12.68	0.86	1.06	0.59	1.56	1.07	1.22	1.24	0.93	1.10

Note: $N = 253$ (122 women, 131 men). Correlations for women are below the diagonal; correlations for men are above the diagonal.
FAS = Functionality Appreciation Scale. BES = Body Esteem Scale. To save space in the table, we include the Intuitive Eating Scale-2 subscale means, *SD*s, and correlations with the FAS here. For women, the FAS was correlated −.03 ($p = .763$) with Unconditional Permission to Eat ($M = 3.23$, $SD = .94$), .20 ($p = .035$) with Eating for Physical Rather than Emotional Reasons ($M = 3.33$, $SD = 1.05$), .41 ($p < .001$) with Reliance on Internal Hunger and Satiety Cues ($M = 3.54$, $SD = .92$), and .45 ($p < .001$) with Body-Food choice Congruence ($M = 3.44$, $SD = 1.15$). For men, the FAS was correlated −.19 ($p = .032$) with Unconditional Permission to Eat ($M = 3.12$, $SD = .90$), .24 ($p = .005$) with Eating for Physical Rather than Emotional Reasons ($M = 3.66$, $SD = .95$), .36 ($p < .001$) with Reliance on Internal Hunger and Satiety Cues ($M = 3.61$, $SD = .82$), and .51 ($p < .001$) with Body-Food choice Congruence ($M = 3.42$, $SD = .90$).
* $p < .003$ (Bonferroni adjustment for number of comparisons).

$p = .035$). Table 3 includes these correlations separated by gender; correlations were fairly consistent between women and men, with no correlations being significantly stronger for women or men as revealed by the Fisher's r to z transformations (all $ps > .169$).

2.2.7. Incremental validity

Incremental validity of the FAS was examined by determining whether it was uniquely associated with each criterion variable (a measure of well-being) above and beyond the variance of existing body image measures (ones that the FAS was hypothesized to be distinct from). That is, a series of hierarchical multiple regression analyses were conducted where existing body image measures were entered at Step 1 and the FAS was entered at Step 2 in the prediction of each criterion variable. A statistically significant increment in R^2 at Step 2 indicates incremental validity evidence for the FAS. Results are reported in Table 4.

Findings from the hierarchical multiple regression analyses revealed that FAS scores were positively associated with both body appreciation and intuitive eating (total IES score, Reliance on

Table 4
Incremental contributions of the Functionality Appreciation Scale (FAS) to relevant criterion variables: Studies 1 and 2.

	Total R^2	ΔR^2	ΔF	β	*t*
S1 criterion: body appreciation, $F(6, 246) = 51.57^{***}$					
Step 1	.382	.382	30.48***		
Body surveillance				−.50	−6.60***
Self-objectification				−.15	−2.36*
Appearance orientation				.52	8.52***
Thin-ideal internalisation				−.18	−3.04**
Muscular-ideal internalisation				.17	3.15**
Step 2	.557	.175	97.47***		
FAS				.46	9.87***
S1 criterion: overall intuitive eating, $F(6, 246) = 12.64^{***}$					
Step 1	.192	.192	11.74***		
Body surveillance				−.42	−4.81***
Self-objectification				−.05	−0.62
Appearance orientation				.28	3.91***
Thin-ideal internalisation				−.14	−1.97*
Muscular-ideal internalisation				−.01	−0.22
Step 2	.236	.044	12.64***		
FAS				.23	3.75***
S1 criterion: eating for physical rather than emotional reasons, $F(6, 246) = 2.95^{**}$					
Step 1	.050	.050	2.59*		
Body surveillance				−.19	−2.04*
Self-objectification				−.07	−0.92
Appearance orientation				.14	1.79
Thin-ideal internalisation				−.05	−0.62
Muscular-ideal internalisation				.04	0.62
Step 2	.067	.017	4.53*		
FAS				.15	2.13
S1 criterion: reliance on internal hunger and satiety cues, $F(6, 246) = 12.78^{***}$					
Step 1	.169	.169	10.03***		
Body surveillance				−.44	−4.95***
Self-objectification				.01	0.11
Appearance orientation				.35	4.85***
Thin-ideal internalisation				−.11	−1.63
Muscular-ideal internalisation				.06	0.96
Step 2	.238	.069	22.25***		
FAS				.29	4.72***
S1 criterion: body-food choice congruence, $F(6, 246) = 17.99^{***}$					
Step 1	.215	.215	13.55***		
Body surveillance				−.27	−3.16***
Self-objectification				−.20	−2.78**
Appearance orientation				.33	4.73***
Thin-ideal internalisation				−.02	−0.33
Muscular-ideal internalisation				.27	4.56***
Step 2	.305	.090	31.75***		
FAS				.33	5.63***
S1 criterion: gratitude, $F(2, 250) = 73.97^{***}$					
Step 1	.259	.259	87.53***		
Body appreciation				.51	9.36***
Step 2	.372	.113	45.05***		
FAS				.42	6.71***
S1 criterion: body appreciation, $F(2, 250) = 179.07^{***}$					
Step 1	.494	.494	244.95***		
Satisfaction with physical condition				.70	15.65***
Step 2	.589	.095	57.78***		
FAS				.35	7.60***
S2 criterion: broad conceptualisation of beauty[a], $F(4, 127) = 8.16^{***}$					
Step 1	.102	.102	4.68**		
SC-kindness				−.09	−0.70
SC-mindfulness				.32	2.36**
SC-common humanity				.09	0.76
Step 2	.212	.110	17.20***		
FAS				.40	4.15***
S2 criterion: life satisfaction, $F(4, 289) = 20.36^{***}$					
Step 1	.201	.201	24.06***		
SC-kindness				.36	4.38***
SC-mindfulness				−.07	−0.80
SC-common humanity				.18	2.53*
Step 2	.222	.021	7.57**		
FAS				.17	2.75**

Table 4 (*Continued*)

	Total R^2	ΔR^2	ΔF	β	*t*
S2 criterion: proactive coping, $F(4, 289) = 37.01^{***}$					
Step 1	.305	.305	41.75**		
SC-kindness				.14	1.83
SC-mindfulness				.29	3.62***
SC-common humanity				.19	2.78**
Step 2	.343	.038	16.21***		
FAS				.23	4.03***

Note: Study 1 $N = 253$ (122 women, 131 men). Study 2 $N = 293$ (134 women, 159 men). S1 = Study 1. S2 = Study 2. SC = self-compassion.

[a] Only sample of women.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Internal Hunger and Satiety Cues, Body-Food Choice Congruence[4]) after excluding its shared variance with low levels of appearance-focused attitudes and behaviour (as assessed by body surveillance, self-objectification, internalisation of the thin ideal, internalisation of the muscular ideal, and appearance orientation). Moreover, FAS scores were positively associated with gratitude after excluding its shared variance with body appreciation, and positively associated with body appreciation after excluding its shared variance with satisfaction with physical condition. These findings suggest that the FAS measures a construct beyond (a) low levels of appearance-focused attitudes and behaviour and (b) high levels of body appreciation and satisfaction with physical condition, therefore upholding H6.

3. Study 2

The primary aims of Study 2 were to replicate the factor structure and internal consistency of the 7-item FAS and to evaluate the 3-week test-retest reliability of its scores. The secondary aims included evaluating the construct validity of FAS scores in relation to additional variables of interest, and determining that FAS scores were not positively correlated with socially desirable responding. We hypothesised that the 7-item FAS would be unidimensional (H1) and yield internally consistent scores (H2), thereby replicating these findings from Study 1. We further predicted that the FAS scores would be consistent over time (H3).

To further uphold the construct validity of the FAS, we hypothesised that it would be positively related to the ability to broadly conceptualise beauty (i.e., find beauty in a variety of appearances and positive internal characteristics), which is another component of positive body image (Tylka & Iannantuono, 2016; Tylka & Wood-Barcalow, 2015b), as well as additional indices of psychological well-being, such as self-compassion, life satisfaction, and proactive coping (H4a). We also hypothesised that the FAS would be inversely associated with believing that cosmetic surgery is an acceptable means to please others, a consideration for oneself, and a way that people in general can feel better about their appearance (H4b). Indeed, it is logical that the more individuals appreciate the functionality of their body, the less likely they would be to compromise this functionality to enhance their appearance. For instance, cosmetic surgery can place the body's overall health and functionality at risk (e.g., breast augmentation is likely to decrease sensitivity in the areolas; Botox limits facial expression and mood; silicone implants can leak; Finzi, 2013; Handel, Garcia, & Wixtrom, 2013; Mofid, Klatsky, Singh, & Nahabedian, 2006), and it is then reasonable that higher appreciation of body functionality would be met with lower approval of cosmetic surgery. We further expected that the FAS would be negligibly related to impression management, a type of socially desirable responding characterised by providing inflated self-descriptions that is often used to discern the discriminant validity of self-report measures (H5).

Last, to further discern its incremental validity, we hypothesised that the FAS would be positively related to broad conceptualisation of beauty and psychological well-being (life satisfaction and proactive coping) beyond its shared variance with self-compassion (H6). If supported, these findings would suggest that the FAS measures a construct beyond self-compassion.

3.1. Method

3.1.1. Participants and procedure

Study 2 was approved by the Maastricht University ethics committee, and participants were recruited via MTurk to complete an online study on "body image and well-being." Inclusion criteria for Study 2 were identical to Study 1, and the survey was hosted on Qualtrics. After completing an electronic informed consent sheet, participants completed the FAS first followed by the remaining measures in a counterbalanced order, responded to demographic questions, and provided their MTurk ID code needed to match their responses across administrations. They received $1 for completing Part A (Study 2 contained fewer items than Study 1) and were asked at the end of Part A if they would like to complete a follow-up study in three weeks (Part B) for an additional $1. They were not informed that they would be taking the FAS again or that the purpose of the study was to gauge the stability of the FAS.

Participants were removed from the final Part A dataset if they terminated early or had significant missing data ($n = 19$), or if they failed at least one of four embedded validity questions ($n = 12$). No participant completed Part A or Part B more than once. From the initial dataset of 324 participants, 134 women and 159 men remained, and their data were analysed. Women ($M_{age} = 36.67$, $SD = 10.48$) and men ($M_{age} = 33.16$, $SD = 9.36$) were between 18 and 69 years old; 25.3% of the sample was age 40 and above, and 9.9% was age 50 and above. Self-reported BMI scores were between 16.47 and 52.45 ($M_{BMI} = 25.60$, $SD = 6.19$) for women and 17.57 and 62.38 ($M_{BMI} = 26.19$, $SD = 5.99$) for men. They identified as White (68.9%), African American (8.1%), Asian (11.9%), Latina/o (7.8%), Native American (0.3%), and Multiracial (2.3%); two participants (0.6%) did not report an ethnicity. Their highest educational level was less than 12th grade (0.3%), high school diploma or GED (13.3%), some college (28.0%), Associate's degree (10.9%), Bachelor's degree (38.2%), some graduate school (0.7%), and a graduate degree (8.2%); one participant (0.3%) did not respond. The majority of women (85.7%) and men (89.9%) identified as heterosexual; of the remaining participants, 2.2% of women identified as lesbian, 3.8% of men identified as gay, 10.4% of women and 5.0% of men identified as bisexual, one woman (0.7%) and one man (0.6%) chose "other," and two women (1.4%) and one man (0.6%) did not respond.

[4] Because of the nonsignificant correlations between FAS scores and the Unconditional Permission to Eat IES-2 dimension, we did not examine Unconditional Permission to Eat as a criterion variable in the incremental validity analyses.

Twenty days after Part A, we contacted those who indicated that they would like to take part in the follow-up survey (98%, $n = 287$) via their MTurk ID code, which is linked confidentially to email. We asked participants to complete the survey within three days if they remained interested. Participants who responded within this time frame ($n = 201$) completed only the FAS, demographic items, and their MTurk ID code. They were awarded $1 and matched to their prior FAS item scores. We were able to match the responses of 189 participants (91 women, 98 men).[5]

3.1.2. Measures

3.1.2.1. Functionality Appreciation Scale. Participants completed the 7-item FAS, described in Study 1.

3.1.2.2. Broad Conceptualization of Beauty Scale (BCBS; Tylka & Iannantuono, 2016). The BCBS contains nine items (e.g., "I think that a wide variety of body shapes are beautiful for women") rated on a 7-point scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Scores on the items are averaged, with higher scores reflecting a broader conceptualisation of women's beauty. In U.S. community women assessed via MTurk, BCBS scores have demonstrated evidence of internal consistency, 3-week test-retest reliability, and construct validity (Tylka & Iannantuono, 2016). Because of the gender-specific nature of this scale, we only scored women's responses. Cronbach's alpha for women in Part A was .89.

3.1.2.3. Self-Kindness, Common Humanity, and Mindfulness subscales of the Self-Compassion Scale (SCS; Neff, 2003). Items from the Self-Kindness (five items; e.g., "I'm tolerant of my own flaws and inadequacies"), Common Humanity (four items; e.g., "When things are going badly for me, I see the difficulties as part of life that everyone goes through"), and Mindfulness (four items; e.g., "When something upsets me I try to keep my emotions in balance") subscales are all rated on a 5-point scale ranging from 1 = *almost never* to 5 = *almost always*. Scores on the items are averaged; higher scores reflect higher levels of self-kindness. Subscale scores have demonstrated internal reliability, construct validity, and three-week test retest reliability in U.S. undergraduate women (Neff, 2003). Cronbach's alphas in Part A were .90 (.90 women, .89 men) for Self-Kindness, .89 (.90 women, .88 men) for Common Humanity, and .85 (.84 women, .86 men) for Mindfulness.

3.1.2.4. Proactive Coping subscale of the Proactive Coping Inventory (PCI; Greenglass, Schwarzer, & Taubert, 1999). The Proactive Coping subscale contains 14 items assessing the formation and pursuit of challenging goals and the ability to work through obstacles that obstruct these goals (e.g., "I turn obstacles into positive experiences"). Items are rated along a 4-point scale ranging from 1 = *not at all true* to 4 = *completely true* and averaged, with higher scores reflecting greater use of proactive coping. Among college samples of women and men, its internal consistency and construct validity has been supported (Avalos et al., 2005; Bergeron & Tylka, 2007; Tylka, 2006). Cronbach's alpha in Part A was .84 (.85 for women, .83 for men).

3.1.2.5. Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). The SWLS contains 5 items (e.g., "In most ways my life is close to my ideal") rated along a 7-point scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Item scores are averaged, with higher scores demonstrating greater life satisfaction. The internal consistency, construct validity, and 2-month test-retest reliability of the SWLS scores have been upheld in research with U.S. community and university samples of women and men (Diener et al., 1985; Tylka et al., 2015). Cronbach's alpha in Part A was .93 (.92 women, .93 men).

3.1.2.6. Acceptance of Cosmetic Surgery Scale (ACSS; Henderson-King & Henderson-King, 2005). The ACSS has three 5-item subscales that assess the extent to which participants endorse cosmetic surgery as a means to please others (Social; e.g., "If a simple cosmetic procedure would make me more attractive to others, I would think about trying it"), as a consideration for oneself (Consider; e.g., "I have sometimes thought about having cosmetic surgery"), and as a way that people can feel better about their appearance (Intrapersonal; e.g., "It makes sense to have minor cosmetic surgery rather than spending years feeling bad about the way you look"). Items are rated on a 7-point scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Subscale items are averaged, and higher scores reflect greater endorsement of cosmetic surgery. Subscale scores have demonstrated internal consistency, 3-week test-retest reliability, and construct (convergent and discriminant) validity in U.S. community and university women (Henderson-King & Henderson-King, 2005). Cronbach's alphas in Part A were .92 (.93 women, .92 men) for Social, .93 (.95 women, .91 men) for Consider, and .92 (.93 women, .92 men) for Intrapersonal.

3.1.2.7. Impression Management subscale of the Balanced Inventory of Desirable Responding-6 (Paulhus, 1994). The Impression Management subscale assesses participants' tendency to respond in a socially desirable manner, and contains 20 items (e.g., "I sometimes tell lies if I have to") rated on a 7-point scale ranging from 1 = *not at all true* to 7 = *very true*. After half of the items are reverse-scored so that higher scores on all items reflect greater impression management, each item rated with a "6" or "7" is assigned one point (all other item scores receive 0 points), and then item scores are summed. Its scores have demonstrated internal consistency, 5-week test-retest reliability, and construct validity in U.S. community and university women and men (Paulhus, 1994; Tylka & Wood-Barcalow, 2015a). Cronbach's alpha in Part A was .82 (.78 women, .84 men).

3.2. Results and Discussion

3.2.1. Preliminary analyses

Item trends in missing data indicated that 4.40% of participants had at least one missing data point. Missing data points, which represented a very small amount of the total data (0.07%), were missing completely at random, $\chi^2(593) = 530.70$, $p = .968$. As a result, fully conditional specification multiple imputation in SPSS 23.0 was used to estimate missing values. Skewness and kurtosis values for the FAS items and other scale and subscale scores were within acceptable limits (i.e., skewness <3 and/or kurtosis <10; Kline, 2010), preventing the need to transform these scores for the planned analyses.

3.2.2. Cross-validating the FAS's factor structure

A PAF exploratory factor analysis with Varimax rotation was conducted on the seven FAS items using SPSS 23.0. Similar to Study 1 data, the size of the KMO (.911) revealed that the FAS items had adequate common variance for factor analysis, and the significance of Bartlett's test of sphericity, $\chi^2(21) = 996.95$, $p < .001$, suggested a factorable correlation matrix. Parallel analysis suggested that the seven FAS items converged into one factor, which accounted for 61.03% of the total item variance. When analysed separately

[5] As a validity check, when matching responses based on participants' MTurk ID codes, we also looked for large discrepancies between participants' demographic answers (e.g., age difference >1 year, change in gender reported) between Part A and Part B. We were unable to match the responses of 12 participants who had matching MTurk ID codes but discrepant demographic responses. We surmised that two people may share the same account in such cases.

by gender, this unidimensional solution accounted for 57.97% and 64.04% of the total item variance for women and men, respectively. Furthermore, no off-diagonal value in the anti-image correlation matrix exceeded <|.30|, suggesting low item redundancy, and all factor loadings well exceeded .50. Thus, the factor structure of the 7-item FAS was replicated in Study 2, supporting H1. Item-factor loadings for the combined sample, as well as for women and men separately, are in Table 1.

3.2.3. Internal consistency reliability

Cronbach's alpha estimates for FAS scores were .89 for the overall sample (.88 women, .90 men). Item-total correlations ranged from .58–.74 for the overall sample, and between .55–.75 for women and .61–.79 for men. Thus, as before, FAS scores were internally consistent for women and men (H2).

3.2.4. FAS means and correlations with BMI and age

Similar to Study 1, the means and *SD*s of the seven FAS items and total FAS were calculated; these means are included in Table 2. Women and men demonstrated similar total scores, as the degree of difference was negligible.

The *p*-value was reduced to .004 to adjust for multiple comparisons (i.e., 12 correlations between the FAS and the variables of interest, including those assessing construct validity, were examined). The FAS was unrelated to BMI for the total sample ($r = -.11$, $p = .060$), as well as for women ($r = -.12$, $p = .186$) and men ($r = -.10$, $p = .194$) separately. Additionally, the FAS was not associated with age for the total sample ($r = .06$, $p = .302$) or women ($r = .13$, $p = .138$) and men ($r = -.01$, $p = .948$) separately.

3.2.5. Test-retest reliability

Intraclass correlation coefficients (ICCs) and paired sample *t*-tests estimated the stability of the FAS's scores using data from the subsample of 189 participants who completed this measure twice, three weeks apart. The ICC between the FAS scores at the first and second administration was .81 for women and .74 for men. Furthermore, FAS scores did not increase or decrease over time for women, $t(90) = -1.45$, $p = .151$ ($M_{T1} = 4.14$, $SD_{T1} = 0.63$ vs $M_{T2} = 4.20$, $SD_{T2} = 0.62$), or men, $t(97) = 0.46$, $p = .648$ ($M_{T1} = 4.15$, $SD_{T1} = 0.62$ vs $M_{T2} = 4.13$, $SD_{T2} = 0.62$). These findings uphold the test-retest reliability of the FAS scores over a 3-week period (H3).

3.2.6. Construct validity

For women, the FAS was moderately positively correlated with broad conceptualisation of beauty ($r = .40$, $p < .001$). For the overall sample, the FAS was also moderately-to-strongly positively correlated with the kindness ($r = .46$, $p < .001$), mindfulness ($r = .51$, $p < .001$), and common humanity ($r = .37$, $p < .001$) dimensions of self-compassion; life satisfaction ($r = .33$, $p < .001$); and proactive coping ($r = .45$, $p < .001$). The FAS scores were negatively related to social reasons for cosmetic surgery ($r = -.23$, $p < .001$) and considering cosmetic surgery for the self ($r = -.21$, $p < .001$) to a slight-to-moderate degree, yet unrelated to intrapersonal reasons for cosmetic surgery ($r = -.01$, $p = .898$). FAS scores were also unrelated to impression management ($r = .02$, $p = .739$). When women and men were examined individually, their data demonstrated similar trends (Table 5). Indeed, correlational comparisons using Fisher's *r* to *z* transformation indicated that women and men did not differ in terms of the strength of the correlations between the FAS and the variables of interest (all *p*s > .074). These findings provide further evidence for the convergent (H4a, H4b) and discriminant (H5) validity of the FAS scores.

3.2.7. Incremental validity

FAS scores were positively related to women's broad conceptualisation of beauty beyond its shared variance with the three facets of self-compassion (this analysis was not performed for men). For the overall sample, FAS scores were positively associated with psychological well-being (both life satisfaction and proactive coping) after excluding its shared variance with the three facets of self-compassion. Table 4 includes these analyses. These findings suggest that the FAS measures a construct beyond self-compassion (H6).

4. Study 3

The aim of Study 3 was to examine the factor structure of the FAS using confirmatory factor analysis (CFA) to determine whether the results of the EFAs reported in Studies 1 and 2 would be confirmed in another sample. We hypothesised that all seven FAS items would load on one latent functionality appreciation factor, and this model would provide an acceptable fit to the data (H1). This model was tested for measurement invariance across gender to ensure that the FAS assessed the same construct for women and men. We predicted that our model would be invariant (H2a–c).

4.1. Method

4.1.1. Participants and procedure

Study 3 was approved by the ethics committee at Maastricht University. Participants were recruited through MTurk to complete an online study that assessed "perceptions of body functionality." Inclusion criteria for Study 3 were identical to Studies 1 and 2, and the survey was again hosted on Qualtrics. Participants completed an electronic informed consent sheet, the FAS, and then responded to demographic questions. They received $0.25 as compensation for their time, which averaged 2–3 min. Participants were removed from the dataset if they terminated early or had significant missing data ($n = 18$), or if they failed the one embedded validity question ($n = 8$). No participant completed Study 3 more than once. From the initial dataset of 522 participants, 234 women and 262 men remained, and their data were analysed. Women ($M_{age} = 36.57$, $SD = 11.53$) and men ($M_{age} = 31.87$, $SD = 9.06$) were between 18 and 68 years old; 23.6% of the sample was age 40 and above, and 10.1% was age 50 and above.

Women's self-reported BMI ranged from 15.64 to 51.69 ($M_{BMI} = 26.26$, $SD = 6.38$) and men's self-reported BMI ranged from 15.80 to 56.49 ($M_{BMI} = 26.05$, $SD = 5.36$). Participants identified as White (72.4%), African American (6.7%), Asian (11.3%), Latina/o (5.0%), Native American (0.6%), and Multiracial (2.6%); seven participants (1.5%) did not report a race/ethnicity. Level of education ranged from less than 12th grade (0.2%), high school diploma or GED (8.3%), some college (28.0%), Associate's degree (11.3%), Bachelor's degree (37.5%), some graduate school (0.8%), and a graduate degree (5.2%). Most women (82.5%) and men (92.0%) identified as heterosexual; of the remaining participants, 3.0% of women identified as lesbian, 3.1% of men identified as gay, 11.5% of women and 3.1% of men identified as bisexual, four women (1.7%) and one man (0.4%) chose "other," and three women (1.3%) and four men (1.5%) did not respond.

4.1.2. Measure

The 7-item FAS was administered. Cronbach's coefficient alpha was .91 (.91 women, .90 men), with item-total correlations ranging from .60–.78 (.64–.81 women, .55–.80 men).

4.2. Results and Discussion

4.2.1. Preliminary analyses

Item trends in missing data indicated that two (0.40%) participants had one missing data point. These two missing data points represented a very small amount of the total data (0.06%), were

Table 5
Study 2 variable means (M), standard deviations (SD), and correlations.

Variable	1	2	3	4	5	6	7	8	9	10	11
1. FAS	–	–	.47*	.50*	.33*	−.22	−.21	.06	.33*	.46*	.11
2. Broad conceptualisation of beauty	.43*	–	–	–	–	–	–	–	–	–	–
3. Self-compassion: kindness	.46*	.21*	–	.76*	.59*	−.23*	−.22	.04	.38*	.53*	.00
4. Self-compassion: mindfulness	.56*	.31*	.73*	–	.63*	−.24*	−.24*	.03	.34*	.52*	−.02
5. Self-compassion: common humanity	.44*	.24*	.68*	.68*	–	−.09	−.08	.08	.36*	.39*	−.07
6. ASCS: social	−.23*	−.28*	−.11	−.13	−.10	–	.88*	.60*	−.07	−.15	.01
7. ASCS: consider	−.23*	−.12	−.22	−.19	−.18	.85*	–	.54*	−.10	−.11	.05
8. ASCC: intrapersonal	−.08	−.05	−.09	−.06	−.09	.74*	.77*	–	−.11	.05	.10
9. Life satisfaction	.32*	.08	.49*	.32*	.39*	.02	−.06	−.06	–	.44*	−.24*
10. Proactive coping	.45*	.39*	.41*	.51*	.56*	−.09	−.11	−.07	.32*	–	−.09
11. Impression management	−.10	.14	−.25*	−.13	−.11	.09	.21*	.09	−.18	−.01	–
Possible range	1–5	1–7	1–5	1–5	1–5	1–7	1–7	1–7	1–7	1–4	0–20
M women	4.15	5.71	3.45	3.63	3.38	3.28	4.03	4.45	4.47	2.86	5.41
SD women	0.61	1.01	0.96	0.88	1.01	1.72	1.94	1.50	1.69	0.49	3.59
M men	4.12	5.08	3.43	3.65	3.35	3.26	3.40	4.55	3.89	2.86	6.75
SD men	0.63	0.97	0.89	0.85	0.97	1.52	1.63	1.29	1.66	0.45	4.29

Note: $N = 293$ (134 women, 159 men). Correlations for women are below the diagonal; correlations for men are above the diagonal.
FAS = Functionality Appreciation Scale. Correlations between the BCBS and the remaining study variables were not calculated for men, as the BCBS is specific to women.
* $p < .004$ (Bonferroni adjustment for number of comparisons).

missing completely at random, $\chi^2(12) = 20.06$, $p = .066$. Fully conditional specification multiple imputation in SPSS 23.0 was used to estimate these missing values. Skewness and kurtosis values for the FAS items were within acceptable limits (i.e., skewness <3 and/or kurtosis <10; Kline, 2010), preventing the need to transform these scores for the CFAs. Once again, FAS scores were unrelated to BMI for women ($r = -.06$, $p = .365$) and men ($r = -.07$, $p = .294$).

4.2.2. Confirming the FAS's factor structure

Mplus Version 6.12 (Muthén & Muthén, 1998–2011) was used to conduct the CFAs and tests of measurement invariance. Consensus among the Comparative Fit Index (CFI), the standardised root-mean square residual (SRMR), and the root mean square error of approximation (RMSEA) was used to determine model fit. As recommended by Hu and Bentler (1999), values around .95 and above for CFI, around .08 and below for SRMR, and around .06 and below for RMSEA suggest a good fit of the model to the data, whereas values of .90–.94 for CFI, .09–.10 for SRMR, and .07–.10 for RMSEA suggest an acceptable fit. Values outside of these ranges generally indicate a poor fit.

Each FAS item was specified to load on the latent functionality appreciation factor. This unidimensional model provided an overall acceptable-to-good fit to the data for the overall sample, as well as for women and men separately. This unidimensional solution accounted for 59.74% of the total item variance (52.83% and 61.71% for women and men, respectively). Table 6 contains the fit indices for the CFAs, and Table 1 includes the item-factor loadings. Thus, the factor structure obtained in Study 1 and replicated in Study 2 was confirmed in Study 3 (H1).

4.2.3. Tests of measurement invariance

Determining whether the FAS was invariant across gender was tested at three levels: (a) configural (i.e., whether similar factors are measured), (b) factor loading (i.e., whether the magnitude of factor loadings is the same), and (c) intercept (i.e., whether the intercept of the regression relating each item to its factor is the same; Chen, 2007). Configural invariance is determined by CFI, SRMR, and RMSEA model fit indices. The configural invariance model provided an adequate-to-good fit to the data (see Table 6). Thus, the FAS items formed a similar functionality appreciation latent factor for women and men (H2a).

Next, factor loading invariance was evaluated. Factor loadings were constrained equally across women and men, and this model was evaluated against the configural model (see Table 6). A chi-square difference (i.e., $\Delta\chi^2$) test allows a statistical comparison between nested models (a significant difference between models indicates non-invariance). However, practical model fit changes should also be explored between the factorial and configural models: if $\Delta CFI \geq -.010$ *and* $\Delta RMSEA \geq .015$ *or* $\Delta SRMR \geq .030$, then factor loadings are non-invariant between groups (Chen, 2007). The factor loading invariant model differed significantly from the configural model, $\Delta\chi^2(6) = 15.57$, $p = .016$; however, the fit indices met the criteria for invariance ($\Delta CFI = -.004$, $\Delta RMSEA = .001$, $\Delta SRMR = .025$). Nevertheless, because of the significant $\Delta\chi^2$ value between models, additional item-level analyses (Byrne & Stewart, 2006) were performed to identify which FAS factor loadings, if any, were non-equivalent. Although Items 4 and 6 had significant $\Delta\chi^2$ values, the changes in the fit indices for either item did not meet Chen's (2007) criteria for factor loading non-invariance. Thus, the magnitude of the factor loadings was similar between women and men, demonstrating the FAS's factor loading invariance (H2b).

Last, intercept invariance was evaluated, and all item-factor intercepts were constrained equally across women and men. This model was evaluated against the factor loading invariant model (see Table 6). Significant $\Delta\chi^2$ values indicate intercept non-invariance; however, the fit indices again were consulted as they are a more persuasive and practical evaluation of intercept non-invariance (i.e., $\Delta CFI \geq -.010$ *and* $\Delta RMSEA \geq .015$ *or* $\Delta SRMR \geq .010$; Chen, 2007). The models did not differ in fit, $\Delta\chi^2(7) = 6.13$, $p = .525$, and the fit indices did not meet Chen's (2007) criteria for intercept non-invariance ($\Delta CFI = .000$, $\Delta RMSEA = .008$, $\Delta SRMR = .001$). These findings suggest that the intercept of the regression relating each item to its factor is the same between women and men, upholding the intercept invariance of the FAS (H2c).

Given that the FAS demonstrated measurement invariance across gender, average FAS scores (item scores and total scale score) can be meaningfully compared between women and men. The Bonferroni adjustment was made to the *p*-value (.006 or .05/8) to control for the number of comparisons. In Study 3, women and men did not differ on the FAS total score or any individual FAS item score, with the effect sizes being very small (see Table 2).

5. Overall discussion

The body image literature has been limited by a scarcity of research on the appreciation of body functionality (Cash & Smolak, 2011; Webb et al., 2015); this research has been stymied due

Table 6
Study 3 model fit indices for the confirmatory factor analyses (CFAs) and tests of measurement invariance (MI) of the FAS Items.

Model	χ^2	*df*	CFI	RMSEA	90% CI	SRMR
Original model						
Overall sample	45.08	14	.984	.067	.046, .089	.022
Women	35.96	14	.977	.082	.049, .115	.032
Men	42.56	14	.971	.088	.059, .119	.034
Measurement invariance (gender)						
Configural invariance	78.52	28	.974	.085	.063, .108	.033
Factor loading invariance	94.09	34	.970	.084	.064, .105	.058
Intercept invariance	100.22	41	.970	.076	.057, .096	.059

Note: Study 3 $N = 496$ (234 women, 262 men). CFI = Comparative Fit Index, RMSEA = root mean square error of approximation, SRMR = standardised root mean square residual, CI = confidence interval.

to the lack of an adequate measure of this construct. Such a measure would promote a more complete and comprehensive understanding of body image, which can potentially contribute to novel and fruitful methods for improving embodiment and evaluating the effectiveness of these interventions. Therefore, we developed a measure of functionality appreciation – the Functionality Appreciation Scale (FAS) – and conducted an evaluation of its psychometric properties across three studies. Overall, the present research demonstrates that the FAS has excellent psychometric support among women and men. Namely, its unidimensionality and invariance across gender were upheld, and its scores were internally consistent and stable across a 3-week period. In addition, FAS scores demonstrated criterion-related and construct (convergent, discriminant, and incremental) validity.

The FAS will be useful in investigating a range of research questions that can contribute to a more fine-grained understanding of body image, including its interplay with aspects concerning physical appearance and positive body image more broadly. For example, scholars have suggested that appreciating one's body functionality may be important for the development of positive embodiment (e.g., Piran, 2015, 2016), preventing or reducing disordered eating (e.g., Cook-Cottone, 2015; Piran, 2015), and fostering adaptive or mindful self-care behaviours (e.g., Cook-Cottone, 2015). In other words, if individuals acknowledge and appreciate what their body does for them, they might be more likely to feel more positively about their body overall, provide their body with nourishment (e.g., nutritious foods, hydration) rather than punishment (e.g., purging, excessive exercising), and protect their body from harmful experiences (e.g., unprotected sun exposure, binge drinking). To test these notions, researchers could use the FAS to investigate whether functionality appreciation predicts other aspects of positive body image, disordered eating, and self-care behaviours across time or in experimental settings (e.g., "Does functionality appreciation predict eating in the absence of hunger in a mock taste test?").

The FAS would also be useful for studying positive image across the lifespan. Namely, scholars have proposed that functionality appreciation is the most salient component of positive body image in older individuals and that body appreciation increases with age because individuals shift their focus to, and become more appreciative of, their body's functionality in comparison to their physical appearance (Tiggemann, 2015; Tiggemann & McCourt, 2013). Thus, the FAS could enable researchers to test whether changes in body appreciation across time are indeed mediated by functionality appreciation. The FAS could be used in samples of younger participants, particularly adolescents, to provide valuable information on ways in which functionality appreciation may fluctuate during ages where the value of body appearance over functioning is rather salient.

The FAS will also be valuable in exploring the potential roles of functionality appreciation in improving body image, designing novel intervention programmes, or enhancing existing ones. For example, programmes based on psychoeducation and media literacy techniques could educate individuals about body functionality (e.g., what is it, what your body does for you) and challenge narrow conceptualisations of physical health and fitness that are depicted by media imagery such as fitspiration (Tiggemann & Zaccardo, 2015). Such programmes could be incorporated into classroom curricula, given the popularity of social media (Pew Research Center, 2017) and the impact of peer appearance pressures and body ideals in adolescence (Ricciardelli & McCabe, 2011; Wertheim & Paxton, 2011). These programmes could even be delivered to parents, as focusing on children's body functionality (rather than their physical appearance) may be a key factor for developing positive body image in girls and boys (Tiggemann, 2015). The FAS could be administered to investigate the efficacy of such efforts.

Further, physical activity and yoga-based programmes, as well as some forms of dance, have been theorised to improve body image via shifts toward emphasising and appreciating one's body functionality (e.g., Cook-Cottone et al., 2013; Mahlo & Tiggemann, 2016; Tiggemann et al., 2014; Swami & Tovée, 2009). Using the FAS, these mechanisms could be directly tested in randomised-controlled trials of such programmes. It could also be useful to develop scripts for fitness, dance, and yoga-based programmes that explicitly draw participants' attention to appreciating their body functionality during practice. Relatedly, research investigating body image in athletes has revealed the complex relationships that they may have with their body, for example in terms of balancing the conflicting messages that they receive about the ideal body within their profession vs. in the broader cultural context (e.g., Lunde & Holmqvist Gattario, 2017). Factors such as competition level and the degree to which their sport is appearance-focused have also been found to influence athletes' body image (see Varnes et al., 2013, for a review). Scholars may find the FAS useful to explore the potential roles of functionality appreciation within sporting contexts, such as in resisting cultural appearance pressures and maintaining a positive body image within appearance-focused sports.

Another potential use of the FAS is within programmes for individuals who experience functional limitations, such as due to diseases, acquired injuries, or structural differences, where appreciating the body's ability to function *to the best it can* may be especially important. For instance, despite the prevalence and impact of body concerns within rheumatic diseases, techniques designed to alleviate these concerns are lacking and practitioners tend to treat only physical symptoms (Jolly, 2011). The items of the FAS could be used to guide the development of tailored intervention materials that focus on enhancing functionality appreciation, and to evaluate changes in body image across treatments. The FAS could also be used to explore, longitudinally, whether functionality appreciation predicts outcomes specific to the functional limitation (e.g., coping with chronic pain). Similarly, given the relationships between functionality appreciation and intuitive eating, it may be valuable to incorporate functionality appreciation into intuitive eating programmes for individuals. It would also be interesting to test whether fostering functionality appreciation could reduce

factors that play a role in the aetiology and maintenance of disordered eating (cf. Tylka & Kroon Van Diest, 2015), such as body surveillance and self-objectification (Fredrickson & Roberts, 1997; Moradi & Huang, 2008), given the FAS's inverse associations with these variables for women.

We are excited about these and the numerous other pursuits that the FAS will make possible. We believe that the FAS will be applicable in a variety of target groups as its items were designed to capture body functionality *holistically* (e.g., not limited to particular bodily functions) and *inclusively* (e.g., assessing appreciation of the body's ability to function to the best that it can). In this respect, it is noteworthy that the FAS is easily and widely administrable given that it comprises only seven items and takes just a few minutes to complete. Further, the psychometric evidence gathered for the FAS supports its use with various statistical analyses (e.g., longitudinal analyses, hierarchical multiple regression) that rely on the assumption that measure scores possess adequate reliability and validity.

Several other noteworthy points concerning the present findings must be mentioned. First, across the three studies, FAS scores in women and men ranged from 4.07 to 4.27 and 3.89 to 4.18, respectively, on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Three of these four scores fall between the answer options *agree* and *strongly agree*, suggesting that online community samples of women and men endorse fairly high levels of functionality appreciation. This finding suggests that functionality appreciation does not align with the notion of "normative discontent" (Rodin, Silberstein, & Striegel-Moore, 1985), whereby most individuals are presumed to experience negative thoughts and feelings about their body. At the very least, the present research suggests that women and men are able to experience appreciation for their overall body functionality *in spite of* cultural overvaluation of physical appearance and narrow beauty ideals. This is especially noteworthy considering that current beauty ideals emphasise visible expressions of so-called fitness or fitspiration, such as lean muscularity (e.g., Barlett, Vowels, & Saucier, 2008; Homan, McHugh, Wells, Watson, & King, 2011). Importantly, FAS scores were not associated with impression management, showing that the present FAS scores are not merely explained by participants' desire to create a favourable impression of themselves.

In a similar vein, it is also important to highlight that FAS scores were not significantly associated with age or BMI, nor did they differ significantly between women and men (in Studies 2 and 3). These findings are interesting because research has shown that body appreciation is positively associated with age and inversely associated with BMI, and women tend to experience lower levels of body appreciation than men do (Tiggemann, 2015; Tylka & Wood-Barcalow, 2015a). More broadly, research has frequently shown that women experience a more negative body image than men (Grogan, 2011), and there is evidence to suggest that individuals with a higher BMI experience a more negative body image as well (Schwartz & Brownell, 2004). Again, these findings are especially noteworthy within a culture that idolises youthfulness and upholds a narrow depiction of what it means to be "physically-fit" and "healthy" (e.g., having a lower body weight; Grogan, 2011; Tylka et al., 2014). Further, individuals may be able to appreciate the functionality of their body despite experiencing any dissatisfaction with their physical appearance.

The present research also provides insight into how FAS scores are associated with scores on other measures related to body image, eating, and well-being. Namely, functionality appreciation was positively associated with body appreciation, appearance evaluation, and satisfaction with physical condition, as well as (in women only) body image flexibility and a broad conceptualisation of beauty. Functionality appreciation was also negatively associated with social reasons for considering cosmetic surgery, and with considering plastic surgery for themselves. With regard to eating and well-being, functionality appreciation was positively associated with intuitive eating, gratitude, self-esteem, self-compassion, life satisfaction, and proactive coping, and negatively associated with anxiety and depressed affect. Importantly, the analyses showed that functionality appreciation is *distinct* from high levels of body appreciation, self-compassion, appearance evaluation, and satisfaction with physical condition, and from low levels of body surveillance, self-objectification, internalisation of the thin and muscular ideals, and appearance orientation. Collectively, these findings suggest that functionality appreciation is an adaptive and unique construct that is intricately linked with a healthier body image, adaptive eating, and psychological well-being. These findings support the prior correlational, interview-based, and experimental research that has indicated the potential beneficial roles of functionality appreciation (e.g., Alleva, Martijn et al., 2015; Holmqvist & Frisén, 2010; Piran, 2016; Wood-Barcalow et al., 2010).

Not all of the predicted relationships were found, however. Specifically, it is unclear why functionality appreciation was *not* associated with eating concerns and dietary restraint, even though it was positively associated with aspects of intuitive eating such as reliance on internal hunger and satiety cues. This finding may be due, at least in part, to the fact that both functionality appreciation and intuitive eating tap into positive ways of being, whereas disordered eating is maladaptive. Indeed, positive and negative ways of being are not necessarily opposite ends of the same construct (Tylka, 2006). This finding also suggests that functionality-focused attitudes and behaviours are distinct from appearance-focused attitudes and behaviours (Webb et al., 2015), which are often strongly positively associated with aspects of disordered eating (Petrie et al., 2009). Furthermore, in men only, functionality appreciation was positively associated with appearance orientation and internalisation of the muscular ideal (relationships were non-significant in women). One reason for these relationships could be that the beauty ideal for men places a greater emphasis on aspects of body functionality that can be aesthetically manifested, such as muscularity and physical strength (Murnen & Don, 2012). As such, men who are more invested in the muscular ideal and more focused on their physical appearance might experience greater functionality appreciation simply because these aspects of their body functionality are more salient to them. Also, while functionality appreciation was negatively associated with body surveillance and self-objectification in women as expected, this relationship was nonsignificant in men. These findings have ramifications for how body functionality has been assessed in the past, where functionality-focused attitudes and behaviours have been positioned at the opposite end of the continuum from appearance-focused attitudes and behaviours, including body surveillance and self-objectification (Webb et al., 2015). The present research suggests that this assumption is unwarranted, and further underlines the importance of administering the FAS when aspects of body functionality need to be assessed.

Last, it is interesting that although body surveillance and appearance orientation were positively correlated with one another, when entered into the same models body surveillance *negatively* predicted the criterion variables (e.g., body appreciation) whereas appearance orientation *positively* predicted them. These findings suggest that appearance orientation may not always be maladaptive. Indeed, Cash (2011) noted that it is important to distinguish between maladaptive and adaptive forms of appearance investment (e.g., engaging in grooming behaviours that project one's sense of style and personality vs. those that alter one's appearance to match the beauty ideal), and Tylka and Wood-Barcalow (2015b) have identified adaptive appearance investment as a key facet of positive body image. Future research should take these dis-

tinctions into account and investigate their respective relationships with functionality appreciation.

5.1. Limitations and extensions

The following limitations of the current research must be noted. First, although the present community-based samples included both women and men and are more diverse than typical college-based samples, the majority of participants identified as White, heterosexual, and had at least some college education or higher, and their average age was about 30 years old. A logical extension of the present study then would be to conduct research on the FAS across a more diverse range of intersecting social identities, cultural contexts, ages and developmental stages, abilities, and geographical areas. To this end, it will also be necessary to develop and evaluate versions of the FAS in different languages, and to determine its cross-cultural equivalence. Notably, the FAS items were worded to be general rather than specific, which may more easily transfer to other ethnic, racial, and cultural groups. Second, although significant associations were found between FAS scores and other measures related to body image, eating, and well-being, it is imperative to conduct experimental and longitudinal research using the FAS to explore questions of causality and directionality (e.g., "Do improvements in functionality appreciation cause improvements in intuitive eating, or vice versa?"). Third, the present study investigated only associations between FAS scores and key variables of interest, and this work could be extended by incorporating additional aspects related to body image (e.g., social comparison tendencies), ill-being (e.g., excessive exercise), and well-being (e.g., happiness) as mediators, moderators, and outcomes within path and structural models. Fourth, the FAS was not counterbalanced with the other measures in Studies 1 and 2. While our reason of presenting the FAS first was to increase the likelihood of participant attentiveness due to item-level choice, retention, and analysis, we acknowledge that order effects may have influenced the strength of its relationships with the other study variables. Fifth, as we have noted, average FAS scores are consistently higher than the neutral mid-point, which may produce skewed scores. Researchers, then, may want to be especially careful to examine the FAS's skewness and kurtosis within their samples to ensure that transformations will not be needed to meet the assumptions of the planned analyses. Relatedly, these higher scores could produce a ceiling effect, for example in the context of programmes that aim to enhance functionality appreciation (unless the programme is delivered to target groups who have low functionality appreciation). These are also possibilities that should be considered and explored in future research.

5.2. Conclusions

The FAS is a unidimensional measure that is invariant across gender and that has evidenced strong psychometric support across three community samples of women and men. The FAS assesses functionality appreciation in a holistic sense and its items are inclusive of individual bodily experiences and capacities. Functionality appreciation is a distinct construct from body appreciation, self-compassion, and low levels of body surveillance, self-objectification, beauty-ideal internalisation, and appearance orientation. Moreover, functionality appreciation is an adaptive construct, associated with various aspects of a more positive body image and less negative body image, as well as more adaptive eating and greater well-being. To capture body image more comprehensively, the FAS should be added to assessment packets that comprise other measures of positive and negative body image, including measures that are related to physical appearance. With only seven items and taking just a few minutes to complete, the FAS is easy to administer and score, facilitating its integration within research, clinical, prevention, and educational contexts.

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